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Trends in breast cancer mortality in Trinidad and Tobago—A 35-year study

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ABSTRACT

Background: Breast cancer is the most frequently diagnosed cancer among women worldwide. This study examines the breast cancer mortality patterns and trends in the Caribbean island state, Trinidad and Tobago for the 35-year period, 1970–2004. **Methods:** A retrospective analysis of the trends in breast cancer mortality from 1970 to 2004 was conducted. Crude mortality per 100,000 women, age-standardized mortality using World Standard population and age-stratified mortality were calculated and comparison was made between age groups above and below 50 years. **Results:** A general pattern of increase was observed in both crude and age-standardized mortality. The overall average crude mortality was 15.6 per 100,000 women (95% confidence interval (CI) 13.9–17.1) and the average age-standardized mortality was 18.0 per 100,000 women (95% CI 16.7–19.2). There was a pattern of increase in mortality with increasing age. The mortality rate was considerably higher for the age groups above 50 years than those less than 50 years of age both showing an upward trend over the 35-year period. **Conclusions:** Breast cancer mortality continued to increase over the 35-year period in Trinidad and Tobago. This study did not identify the exact reasons for this increasing trend. However, it is known that Trinidad and Tobago is becoming much more industrialized. It may be speculated that decrease in fertility rates, increase in the incidence of obesity and hormone utilization could have influenced this trend.

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1. Introduction

Breast cancer is one of the most common cancers and the leading cause of cancer deaths among women worldwide [1]. In the year 2000, more than one million women were diagnosed and 373,000 women died of breast cancer globally [2]. There is an observed difference in the incidence and mortality of breast cancer between developed and developing countries [1]. The age-standardized incidence of breast cancer in developing countries is 23.1 versus 63.2 per 100,000 in developed countries [1]. Although there is a considerable difference in the incidence, mortality due to breast cancer was comparable between the developing and the developed world. In the year 2000, there were an estimated 189,000 deaths in the developed countries and 184,000 in developing countries due to breast cancer [1]. Generally the observed mortality due to breast cancer in the developing countries is less than that of the developed ones. The estimated mortality rate of breast cancer in India during 2002 was 10.4 per 100,000 women, compared to 24.3 in the United Kingdom [3]. Similarly in the same year, Brazil reported a mortality of 14.1 per 100,000 women, in comparison to 19.0 in the USA [3].

Currently, cancer registries have suggested that age-standardized incidence rates are rising rapidly in traditionally low incidence regions such as Africa and Asia [4]. There are many reasons put forward for this increase, which include socioeconomic and lifestyle modifications such as dietary habits, delayed childbearing and associated changes in menstrual patterns [5]. In addition, increasing life expectancy in the developing countries is likely to increase the burden of breast cancer in these regions because older women are far more likely to suffer from the disease than younger ones [5]. The increase in incidence may also contribute to an overall increase in the mortality rates due to breast cancer.

With regards to Trinidad and Tobago (T&T), and by extension the Caribbean region, data concerning the burden of breast cancer is very sparse. T&T is a twin island Republic in the southern Caribbean, lying northeast of the South American nation of Venezuela. According to the last population census in 2000, the estimated population was 1,262,366 of which 629,315 were female [6]. T&T has a multiethnic population comprising of African (40%), Asian Indian (40%), and other (20%) (including mixed, Caucasian, Chinese, and Amerindian) descent. T&T is highly industrialized compared to the other neighboring Caribbean islands with a Gross National Income (GNI) of 14,480 US dollars per capita in 2007 [7].

With this background, the objective of this present study is to ascertain and report the mortality rate of breast cancer in T&T between 1970 and 2004.

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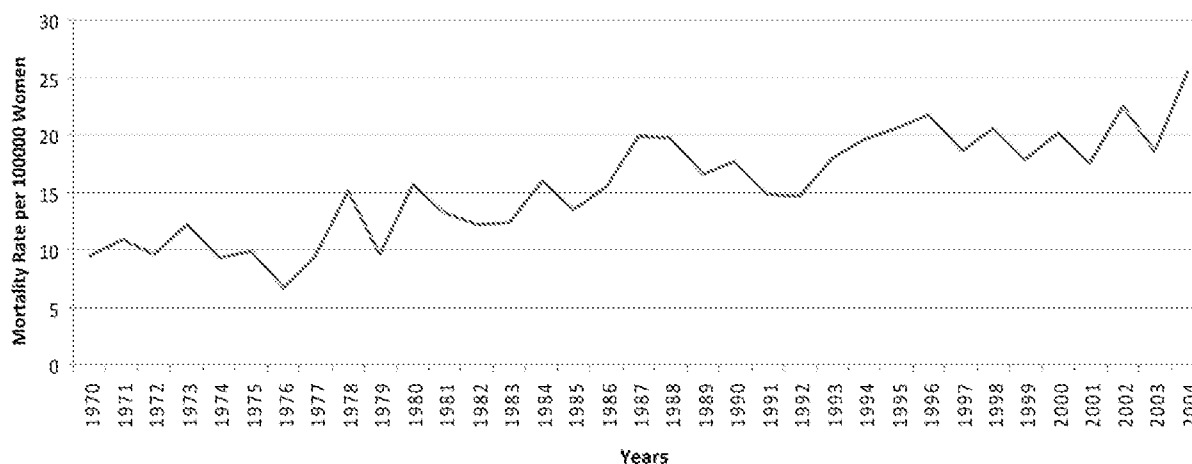


Fig. 1. Trends in crude mortality (1970–2004).

2. Materials and methods

Data regarding the population of T&T and the mortality for breast cancer among women in T&T between the years 1970–2004 were extracted from the Central Statistical Office of T&T. The Central Statistical Office is a division of the Ministry of Planning and Development with the responsibility of taking censuses in the Republic of T&T and collecting, compiling, analyzing and publishing statistical information relating to all social and economic activities. Although incidences of diseases are not well captured by this office, the mortality data in T&T are reasonably well captured due to stringent statutory regulations.

Breast cancer mortality data from the Central Statistical Office were derived from death certificates. Population data was derived from censuses performed every 10 years with mid-year estimates performed annually. Data was then stratified for persons 20 years and above based on 5-year age groups, starting from 20 to 24 years, 25 to 29 years, etc. until >80 years of age. There were no deaths due to breast cancer in women less than 20; hence, age groups less than 20 were not used. Different mortality rates for this 35-year period were then calculated using the following definitions and formulae.

2.1. Crude mortality

Crude mortality rate for breast cancer per 100,000 was calculated using standard formula. Mortality rates were calculated for each year throughout the 35-year study period. The average mortality was calculated for the total study period.

2.2. Age-stratified mortality

Mortality rates for each 5-year age group from 20 to >80 years were calculated. The age-stratified mortality rate for each group was calculated using the standard formula.

The mortality rates for those <50 years and those >50 years of age for each year were also calculated.

2.3. Age-standardized mortality

The age-standardized mortality rate was calculated using the World Standard population provided by Segi 1960 [8].

Exact Poisson 95% confidence intervals were calculated for the crude and age-stratified mortality. Statistical analyses were done using Statistical Package for Social Sciences, version 12 (Chicago, IL, USA).

3. Results

In T&T, during the period from year 1970 through 2004, there had been a general increase in the mortality rate from breast cancer among women. In 1970, the crude mortality rate was 9.4 per 100,000 women which sharply increased to 25.5 per 100,000 women in the year 2004. Fig. 1 shows the trends of crude mortality for each year during the study period.

There is a general increase in the age-standardized mortality rate throughout the 35 years. In the year 1970, the age-standardized mortality rate was 14.9 per 100,000 women which had risen to 24.4 per 100,000 women in 2004; this rise was not steady as there were peaks and troughs. Fig. 2 shows the trends of age-standardized mortality for each year during the study period.

There has been a general rise in the mortality in both under and over 50 age groups, over the 35-year period. Fig. 3a and b shows the comparison of the mortality for women above and below 50 years of age. Overall, in women less than 50 years of age, the mortality ranged from 3.8 in 1970 (2.0 in 1974) to 9.2 in 2004 per 100,000 women. However, in women above 50 years of age, the mortality increased from 48.6 in 1970 to 1994 in 2004.

Table 1 shows the age-stratified mortality in the different age groups, along with 95% confidence intervals for the total study period.

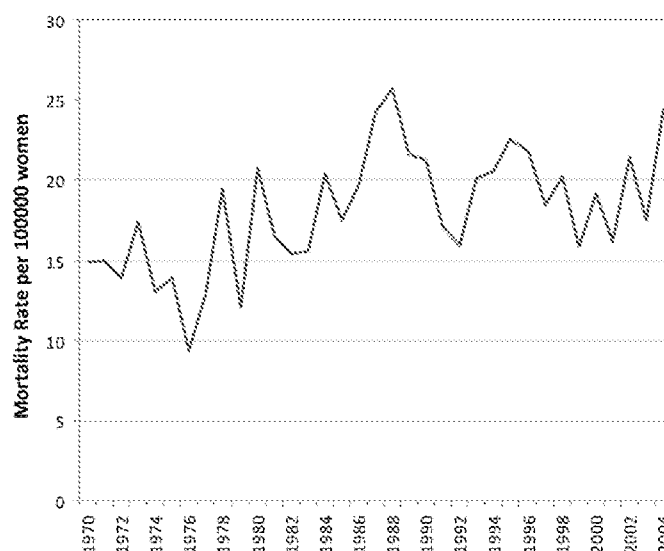


Fig. 2. Trends in age-standardized mortality (1970–2004).

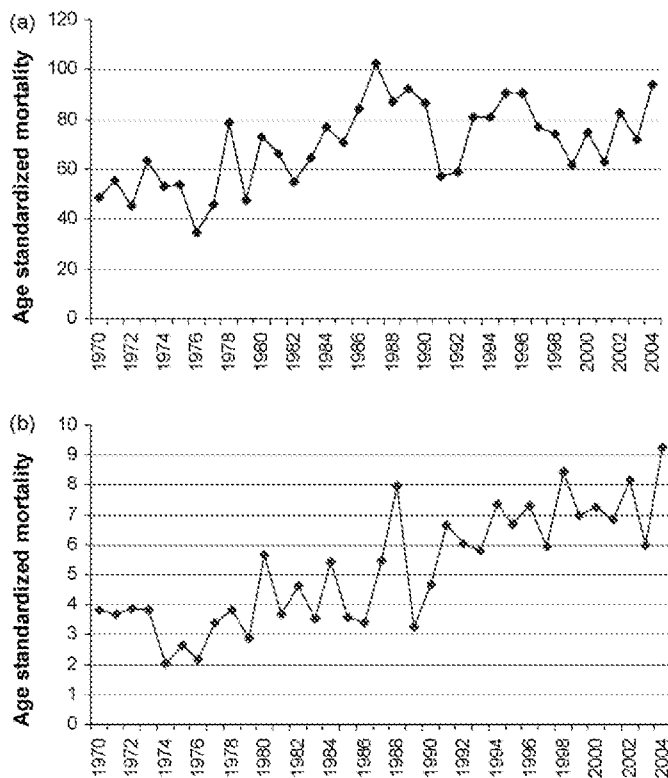


Fig. 3. (a) Age-standardized mortality in women above 50 years of age and (b) age-standardized mortality in women below 50 years of age.

Fig. 4 shows the trend of age-stratified mortality rate of women over the 35-year period. As the age of the women increased the mortality rates also rose. The lowest mortality was seen in the 20–24 age group (0.2 per 100,000 women) and the highest (176 per 100,000 women) in the 80+ age group.

4. Discussion

Our study explores the trends in breast cancer mortality among women in Trinidad and Tobago from 1970 to 2004. The major finding of the study is that the mortality rate increased throughout the 35-year period and continued to rise without leveling off. This is in contrast to many developed countries where the mortality is leveling off or decreasing [9–12].

There are several possible reasons for the increase. One of the reasons contributing to the increase could be due to improved

Table 1

Age-stratified and age-standardized breast cancer mortality in Trinidad and Tobago from 1970 to 2004.

Age group	Number of cases	Age specific rate	95% CI
20–24	4	0.2	0.0–0.5
25–29	21	1.4	0.8–2.1
30–34	75	5.9	4.2–7.7
35–39	138	12.0	9.7–14.2
40–44	213	21.3	17.8–24.8
45–49	291	35.6	29.5–41.7
50–54	304	45.3	39.8–50.8
55–59	313	55.2	47.5–63.0
60–64	263	57.5	49.1–65.9
65–69	267	66.9	57.2–76.5
70–74	239	79.8	65.3–94.2
75–79	229	106.9	91.8–122.0
80+	332	173.3	150.3–196.3
Age-standardized rates (World)		18.0	16.7–19.2

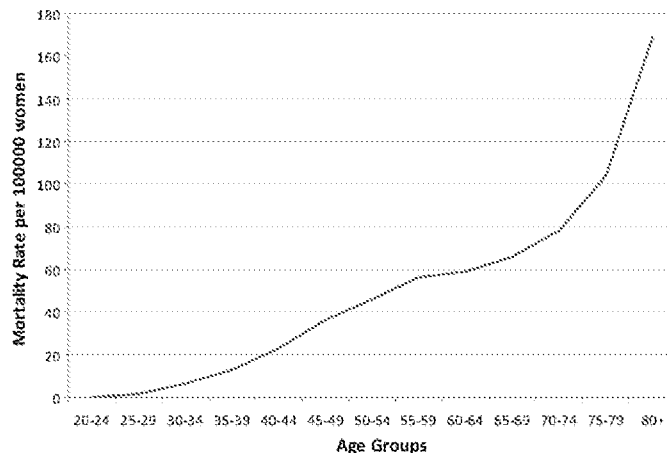


Fig. 4. Age-stratified mortality in different age groups.

disease registration over time. Exposure to the known risk factors for breast cancer has increased within the T&T female population. Some of these factors include obesity, later age at first pregnancy and decreased number of pregnancies. Although T&T is still a developing country, the population has increasingly adopted a westernized diet and lifestyle over the past 40 years; there is increasing obesity in T&T and, in fact, many other Caribbean islands [13]. Breast cancer is also linked with delayed age at first pregnancy which increases the length of time a woman is exposed to estrogen during her lifetime. There has been a decrease in fertility rate in T&T between 1970 and 2006. In 1970 it was 3.5 per woman, dropping to 2.4 in 1990 and then to 1.6 in 2006 [14,15]. It is also our impression that with increasing westernization, improved literacy, more women pursuing tertiary education and greater contraceptive use, age at first pregnancy is increasing. According to the Cancer Registry of T&T, the overall incidence of breast cancer is 29.9% of all cancers during the period of 1995–1999 [16]. The crude and age-standardized incidence rate for the same time period was 36.8 per 100,000 each [16]. These rates increased to 40 and 38.8 per 100,000 during 2000–2002 [16]. Thus the increasing trend in the incidence of breast cancer well correlates with the increasing trend in mortality from breast cancer found in our study.

Another possible explanation for this increasing trend may be genetic and racial factors. About 40% of T&T's population is of African descent. The Cancer Registry of T&T reports that 45.9% of the breast cancer cases belonged to the African ethnicity, 27.5% Asian Indian and 14.7% belonged to the mixed ethnicity [16]. Thus the highest incidence of breast cancer seems to be in the Afro-Trinidadian population. Additionally, previous reports have shown that mortality rates from breast cancer are higher in people of African descent [17,18]. This has been attributed to both genetic and socio-economic factors.

There have been few published data regarding breast cancer mortality from other countries of the Caribbean. In the year 2000, Barbados reported a mortality rate of 34.9 and Jamaica 18.3 per 100,000 women in 2002 compared to 19.1 in T&T [19,20].

Mortality was comparable between T&T and the developed countries. The age-standardized mortality was 20.5 in T&T during 1994, similar to USA and Australia (20.7 and 20.4) [21]. Similarly during 1995, the mortality in T&T was 22.6 compared to 25.1 in the United Kingdom [21].

Beginning in the early 1990s, there has been an observed leveling off and also a subsequent decline in mortality in some European countries, the United States of America and Canada [10,11,22]. This decline has been attributed to many factors such as the implementation of mammography-based screening programs,

advances in treatment and increased breast cancer awareness amongst others [10,23]. These factors may assist in early detection and subsequent possible curative treatment at an earlier stage of the disease. In T&T however, there has been no decline in the mortality over the 35 years. T&T does not have a mammography-based national screening program, although it is highly controversial if this would have helped anyway in reducing the mortality. The value of mammography-based screening in reducing mortality has not been well established [24,25]. This is especially true in the Latin America and the Caribbean [26].

T&T has higher age-standardized mortality due to breast cancer when compared to other developing countries. The mortality in Mexico during 1993 was 8.9, compared to 20.1 in T&T. During 1994, the mortality in Columbia was 9.1 compared to 20.5 in T&T. In Kazakhstan it was 12.8 during 1995, compared to 22.6 in T&T [20]. There are many possible reasons for these differences such as diet, genetics, population demographics, patient awareness and also a combination of all these factors. Most developing regions, especially Latin American countries report intermediate rates of breast cancer occurrence and incidence and mortality although currently it has been observed that there has been an increasing trend in most of these countries [26]. This increasing pattern is clearly demonstrated in the data for T&T and has also been documented in some European countries such as Greece, Italy, Hungary, Portugal, Poland and Spain [27]. However, in a more recent study, some of these countries have started witnessing a decline [28].

In T&T, there has not been a nationally adopted breast cancer screening programme. Although hypothetically it may be possible that due to lack of such a programme, many cases in T&T could have been discovered at an advanced stage, which could have probably influenced the treatment and consequently mortality, this cannot be clearly established [25]. In fact, there is data to suggest that 80% of the presentations in T&T can be regarded as early stages of breast cancer [29]. Interestingly, it has been seen that in some developed countries, there was still a decreased mortality even before the implementation of mammographic screening [25]. Furthermore in T&T, there is poor access to treatment facilities in the public healthcare system and lack of breast cancer awareness programmes.

The increasing trend in mortality in T&T may in part be due to factors such as ethnicity, lifestyle changes and early onset of the disease. Our data shows that the <50-year age group accounted for approximately one-third of the total mortality during the study period. This is indeed a high proportion and it may be possible that younger women suffer a more aggressive form of breast cancer or that the treatment for these pre-menopausal women has been less than ideal [30,31].

Similar to our study, increased mortality in the >50 year age groups is also observed in other populations and specifically in African ethnicity [12,28,31]. Co-morbid illnesses and other risk factors contribute to this increasing mortality in the older age group.

In summary, the trend in breast cancer mortality in Trinidad and Tobago continued to rise over the 35-year period. Significant increases have been observed in both the under and over 50-year age groups. Large epidemiological studies need to be conducted to elucidate the reasons for this trend and measures should be implemented to reverse the growing trend.

Conflict of interest statement

None declared.

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